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ABSTRACT

This brief review concentrates on ten commercially produced programs for general mathematics courses in grades 9 and 10. The review is designed to assist teachers in assessing programs for low-achieving mathematics students. Nine Australian schools participated in a test project of these programs during the last term of 1974. For each program, the full title of the program is listed, its publisher, a description of the materials used, cost, and teacher comments about the program. Some programs provide for individual instruction and short term goals; others present mathematics in a concrete manner through various games and other novel approaches; environmental and practical problems form the basis of still other programs outlined. A table presents an overview of the programs tested, rating the programs in terms of emphasis upon such aspects as environmental and mathematical topics, low reading age, improving problem solving techniques, increasing computational skills, using a carefully sequenced mathematics program, and involvement of students with concrete materials. (JW)

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RESOURCES REVIEW

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A Review of Programs for Low Achievers in Grade 9 and 10 Mathematics

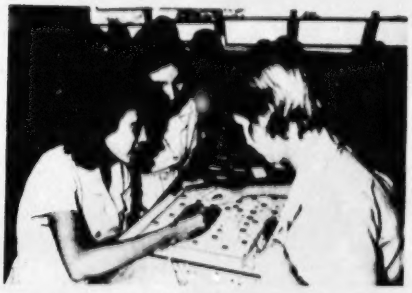
ED127117

Three heads are better than two

A game for three

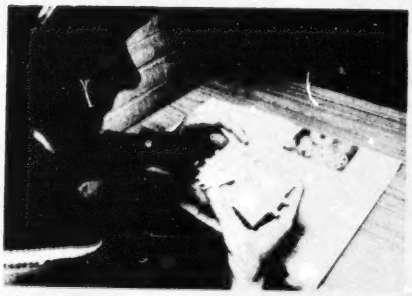
Games for spatial relationships

Quiet study

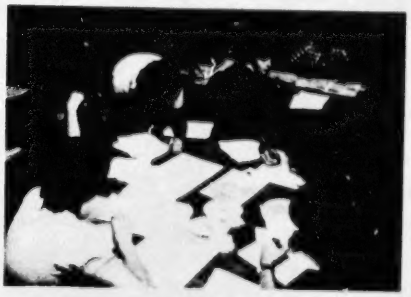


Friendly discussions over a game

Maths can be fun—and noisy



Solving problems individually



Group work within the classroom

Helping each other

SE 020 488

RATIONALE

Some students may be experiencing difficulty with the General Mathematics course in Grades 9 and 10. Where this is so, the reasons include low mathematics ability, reading difficulties, lack of self-motivation, psychological problems and cultural differences.

The General Mathematics class, more than any other, cannot be thought of as an entity. It is really a broad collection of individuals at various stages of development. The common element is a past performance in Mathematics tests which identifies them as low achievers in Mathematics so that the school has placed them in a General Mathematics class. Many of the students' individual difficulties may not be directly connected with mathematical ability.

Students in General Mathematics tend to require the setting of short-term goals, a maximum of easily-read explanation early in the material, a quick feedback concerning correct methods and answers, a more practical approach to the subject, a variety of content and teaching methods and greater security within the school society.

Consequently the teacher who incorporates in his teaching an interest in the individual, some forms of task control, variety and mathematical topics related to student interests, will satisfy many student requirements. Some programs reviewed here help the teacher provide for individual instruction and short-term goals. Others attempt to present Mathematics in a concrete manner through various interesting, novel approaches.

Some General Mathematics students may be under-achieving in Mathematics solely because they have low reading ability. These students may be helped by programs designed to keep reading and specifically mathematical terminology to a minimum. These students can exhibit a serious lack of persistence, a tendency to accept the first solution although external evidence points to its falsity and a random, non-structural approach to problem solving.

This area of problem solving is presently receiving much attention from educational researchers. Teachers can hope to influence their students only by increasing the motivational components of their programs. Environmental and practical problems of wide interest form the basis of some of the programs discussed later in this *Resources Review.* It is hoped that these programs, by controlling the type and depth of mathematical knowledge required to solve problems related to the real world, will help students to understand the practical uses of Mathematics. Interest can often be stimulated by mathematical games which must be carefully chosen and, where necessary, adapted so that problems are presented at appropriate levels of difficulty and motivation.

It is unlikely that any one program will recommend itself to teachers as being suitable for all General Mathematics students or that it will adequately meet syllabus requirements. The teacher must identify for himself the strengths of the program he has chosen to use and rectify the deficiencies.

This *Resources Review* is designed to help teachers by supplying information about available programs, by recording the comments of teachers and students who have used the materials and by commenting on commercial programs in ways which should help teachers assess and compare them.

DETAILS OF THE TRIAL

In June, 1974 all relevant publishers were asked to supply details of all Mathematics programs readily available in Australia which might be suitable for use with low-achieving students. Copies of these programs were obtained and held in the Resources Centre of the Education Department. Metropolitan schools were then invited to participate in a project to test one of these programs during the last term of 1974. Nine schools replied and teachers of their Grade 9 and 10 General Mathematics classes were invited to attend a familiarisation morning during which, first of all, the programs were explained briefly. Each teacher was allowed the rest of the morning to choose the program and book most appropriate to his or her students.

As the Table below indicates, a wide range of programs was chosen. Teachers were asked to keep diaries to record comments on organisation differences, types of support material required, general student feeling towards the trial program and the teacher's own feelings concerning the trial.

It was hoped that by keeping diaries, initial reactions to the trial programs could be recalled as clearly as more recent experiences. Each teacher was visited at least twice during the trial period and the teacher's diary often began the discussion. Where possible, students were encouraged to talk to officers of the Curriculum Branch visiting classes and comment freely on any aspect of the trial. Each teacher provided a final written report on the trial and these reports, together with teacher diaries and discussions, form the basis of the sections entitled 'Teacher Comments' and 'General Comments'.

Organisation and teaching method in the classroom were expected to be affected by the use of these programs, as the emphasis on practical activities and discussion among students would necessarily produce more movement and noise within the classroom. However, this aspect is not especially noted here, although many teachers' comments indicate that this increase in noise and mobility has meant fewer rather than more discipline problems.

The photographs of students on the front cover of this *Resources Review* make it evident that their teachers were able to encourage a freer classroom atmosphere while integrating a variety of materials, as well as the trial text, into their teaching.

The following pages look in detail at each program tested. The first section of each report lists the full title of the program, its publisher, a description of the materials used and cost. The second section presents teacher comments about the test.

Where more than one book or section of a series was tested, each is reported on separately, e.g. Holt, Books 3, 4 and 5 are treated separately although many comments could be applied to any one of the series.

Program \ School	Oxley	Hendra	Newmarket	Mitchelton	Acacia Ridge	Toowong	Beaudesert	Indooroopilly	Coorparoo
Units in Mathematics		Gr.9						Gr.9	
S.M.P. Book C								Gr.9	
Individualising Mathematics – Skills and Patterns		Gr.9							
– Patterns and Discovery							Gr.10		
Activities in Mathematics Second Course – Proportions	Gr.9								
– Geometry					Gr.9				
Maths: Book 3			Gr.9						Gr.9
Maths: Book 4						Gr.9			
Maths: Book 5						Gr.10			
World of Mathematics, Books 5 and 6				Gr.10					

UNITS IN MATHEMATICS

General Description

Publisher: Reed Education.
Suppliers: Barker, Conlan and Ferret, 10 Clark Street, WEST END, Qld. 4101.
Schools: Indooroopilly and Hendra State High Schools.
Teachers: Susan Fix and Denis Sullivan.
Class: Grade 9.

Materials Used

Student booklets (costing 40 cents each):
- Measurement
- Surveying
- Topology
- Drawing plans
- Probability
- Model building.

The six booklets used here are very practically oriented. The presentation is attractive and the reading level is suitable for students with low reading ability. A special feature of the unit is the listing at the bottom of each page of the new or difficult words used. The students use the booklets to write in answers, so no separate work pads are required. This also means, however, that the books are not re-usable. Both activities and questions are clearly labelled throughout. For the practical work a lot of support material is required, e.g. the teacher's list of materials for the Measurement unit comprised chalk, tape measure, stop watches, rulers, cardboard, different shaped vessels, thermometers, silver paint, black paint, 1 kg mass, and scales.

About 30 titles are available and some of these topics are especially suitable for girls, e.g. pattern drafting and house furnishing.

Teacher Comments

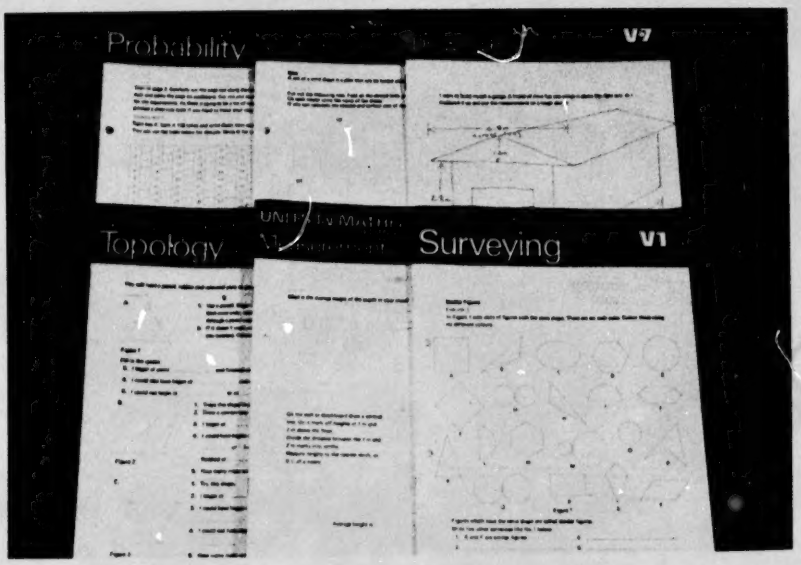
– Indooroopilly State High School

The Measurement unit was probably too easy for students at this level, although I think many of them benefited because they were measuring in metric units for the first time.

The Surveying unit begins similarly and contains much activity work outside the classroom. The students enjoyed group work outside, except for a couple of wet days when we should have been measuring shadows. The manipulation of formulae towards the end of the unit was rather difficult for some students.

The Topology unit was the least environmental, but was still very practical. The unit covered equivalent shapes, simple closed curves, traceable figures and the Moebuis Strip. The students enjoyed the unit despite some parts being rather tedious.

Generally the students worked well with the units, but most of them felt that they



were not doing Mathematics. The small booklets seem a good concept for these students, although they are easily torn and crumpled.

– Hendra State High School

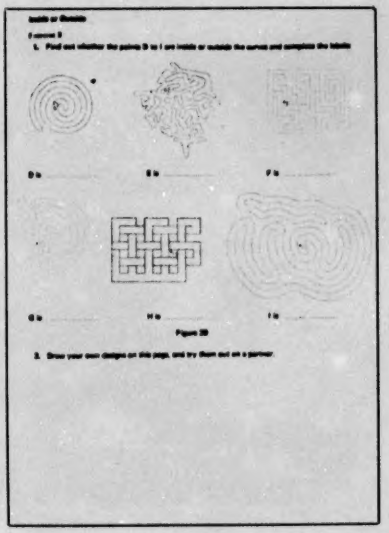
The material in the units is generally very well organised. The first exercises are easy, but the later exercises become progressively harder. Although the booklets do not look very attractive, they are self-motivating and the students worked well.

The booklets provide plenty of space around the exercises for workings and answers. The booklet on Drawing plans is particularly notable for its attempts to get the students involved in a creative way. Some students initially had trouble reading the units, but this was probably because of unfamiliar presentation rather than reading disability. The level of difficulty proved reasonable for these Grade 9 students.

General Comments

The concept of small units of work is very attractive to General Mathematics students. A time span of approximately two to three weeks seems adequate for most students to cover the topic adequately. It also allows a student not having success with the unit to put this experience behind him and to make a fresh start every two to three weeks.

Although the test was conducted only in Grade 9, the booklets could probably also be used effectively with either Grade 8 or Grade 10 groups. In Grade 8 the booklets would provide student motivation but would require much teacher support to



enable the concepts to be fully developed. In Grade 10 the booklets could be used as self-contained student units for use by groups or individuals while the teacher provided special instruction or guidance to other groups.

S.M.P. BOOK C

General Description

Publisher: C.U.P.,
184 Sussex Street,
SYDNEY. N.S.W. 2000.
School: Indooroopilly State High School.
Teacher: Barry McNamara.
Class: Grade 9.

Materials Used

Student Book C: $2.50.
Teachers Book C: $5.00.

This series was not specifically designed for low-achieving students but was included in the selection because of its emphasis on student participation and the practical nature of topics chosen for study.

The full series consists of Books A to H for 12 to 16-year-old students. If used as a full series from Grade 8 to Grade 10, it would cover the majority of the ordinary Mathematics syllabus. (Certain sections of formal algebraic procedures are not covered in the detail required by the syllabus.)

Book C would normally be used by 12 to 13-year-olds of average ability, so the choice of Book C for lower achieving students seems a suitable one. The presentation is clear and is in two colours.

The main topics in Book C are area, directed numbers, graphs, relations, reflections and rotations, multiplication and division of decimals and statistics. Traditional books of exercises are not provided. The student, having worked through the text either individually or in groups and having completed all the activities suggested, is *not supposed* to require them.

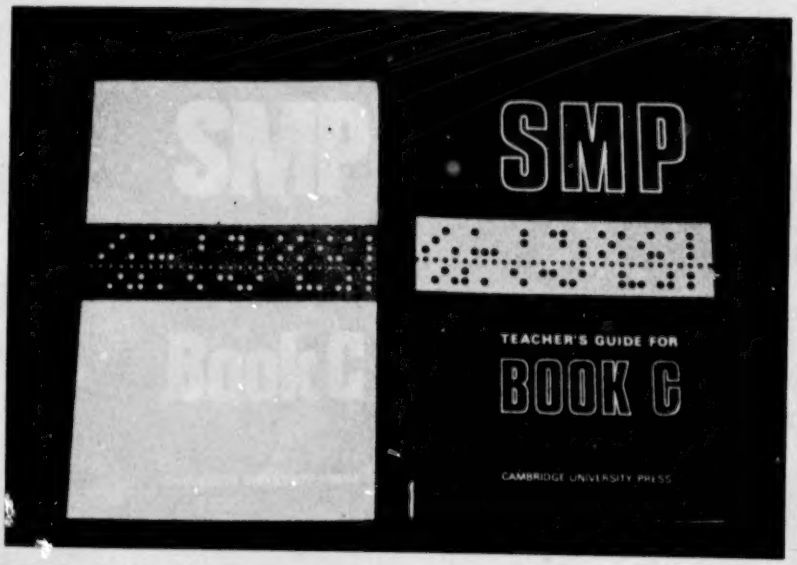
Also available are student work cards to supplement combined Books A and B and combined Books C and D. These were unfortunately not available in Brisbane during the test period, but are now available. Teachers should consider these as one means of promoting individual and group methods in the classroom.

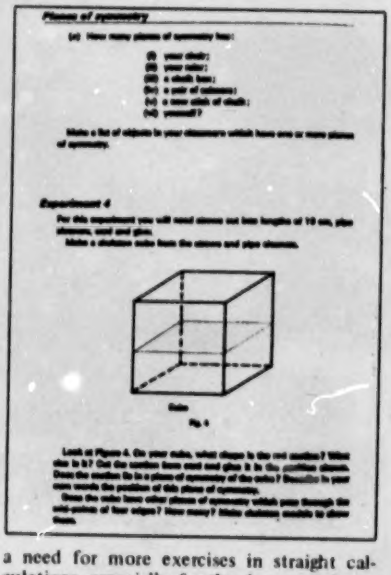
Teacher Comments

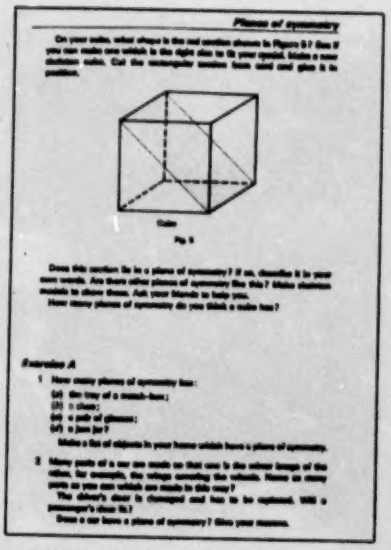
Student response on the whole was quite good. After a short initial unsettled period students accepted the course and there were no behaviour problems at all. Some of the better students have gained an appreciation of the Mathematics component of everyday situations and I think that this is the most valuable result of the experiment.

This is definitely not a course to go into 'cold'. Apparatus and materials must be to hand – graph paper, tracing paper, masking tape, compasses, rulers, scissors – and the teacher must know what each activity is trying to achieve. Larger working tables would have helped in many of the activities.

I feel that while practical work with tangible materials is necessary, there is still a need for more exercises in straight calculations, especially for the slower students. This would satisfy the demands of both parents and students that the General Mathematics course be 'useful'.







General Comments

In such a course as S.M.P. it is not always easy to see that traditional aspects of mathematical skill building are being taught. The total program, A to H, aims at:

- developing a student capable of organising a problem into a logical pattern which is capable of solution if sufficient input data is available,
- introducing the student to such mathematical concepts as sets, transformations, matrices and vectors through an investigatory approach and
- the formulation by the student of mathematical models of the physical world and the acquisition of computational skills necessary in this physical situation.

Consequently lack of practice in arithmetical skills is often criticised, as this type of exercise is inherent in the practical, experimental approach and not specifically laid out.

INDIVIDUALISING MATHEMATICS: Skills and Patterns

General Description

Authors: Foley, Jacobs and Basten.
Publisher: Addison Wesley,
31 Albany Street,
CROWS NEST. N.S.W. 2065.
School: Hendra State High School.
Teacher: Margaret Renner.
Class: Grade 9C4.

Materials Used

Student booklets (costing 80 cents each):
- Angles
- Fractions I
- Fractions II
- Probability.

Teachers guide: $1.60.
Student workcards: $45.00.

In the 'Skills and Patterns' series there are eight main booklets and four motivational booklets. The booklets are in most cases of about 32 pages, on one topic which is covered well. The presentation is very simple. Mathematically, the material is highly structured in a series of small steps with plenty of exercises. The motivational booklets ('Probability' is one) provide opportunities for group and class activities. Overall the reading level is very simple and suited to the General Mathematics student.

A box of cards provides a series of extra activities and exercises for students requiring greater depth in particular topics.

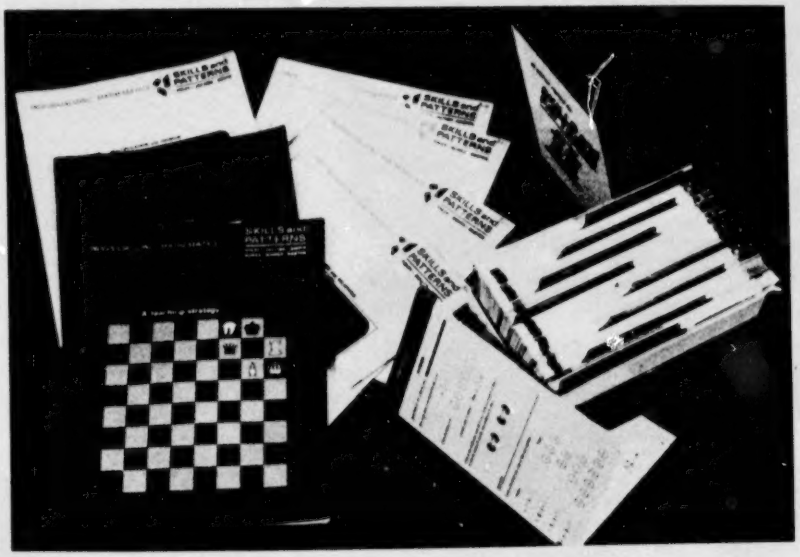
Individualising Mathematics consists of three series:
- 'Skills and Patterns', the simplest of the series, suitable for Grade 8 or 9,
- 'Patterns and Discovery', the middle series of the sequence, suitable for Grade 9 or 10 and
- 'Discovery and Structure', a more difficult series which may still be used with either a Grade 9 or 10 course.

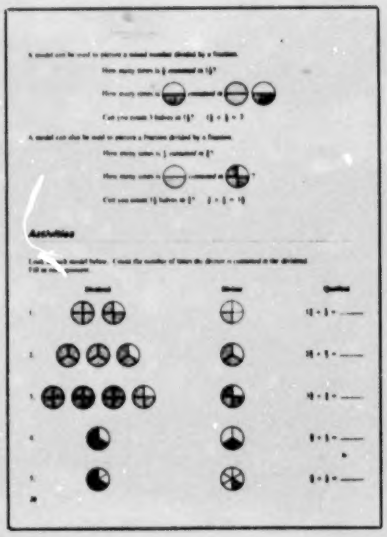
Each series is similarly structured with motivational booklets, main booklets and in-depth cards. Any of the three series could be integrated into a General Mathematics course but with the more difficult sections students would require much help from the teacher.

Teacher Comments

The material was ideal for this relatively small class and catered for the wide range of abilities within the class. I was able to work individually with the girls, although there were certain areas where group teaching could have been more economical in time and would have been equally effective.

I was initially afraid that the material would be too easy, but even the better students had some difficulty and revealed weaknesses in their basic work. The cards provided good follow-up and testing material. Different approaches involving text books and project work were used occasionally to provide variety and reinforcement. The students enjoyed it – especially the less able ones – because they could achieve some success before the work became too hard. The students particularly liked the variety of examples and the gradual increase in difficulty of work through the booklets.





General Comments

As a series especially designed for low achieving students, *Individualising Mathematics* succeeds in motivating students through success at simple mathematical tasks to try to complete harder sections. The process of breaking the work down into a series of very small steps makes the Mathematics seem perhaps too easy. However, as well as ensuring a high student success rate, it does enable exact points of student misunderstanding to be easily determined.

INDIVIDUALISING MATHEMATICS: Patterns and Discovery

General Description

Authors: Foley, Jacobs and Basten.
Publisher: Addison Wesley,
31 Albany Street,
CROWS NEST. N.S.W. 2065.
School: Beaudesert State High School.
Teacher: Gary Ahern.
Class: Grade 9.

Materials Used

Student booklets (costing 80 cents each):
- Whole numbers
- Measurement
- Fractions
- Integers
- Measurement (area and volume)
- Number sentences
- Polygons
- Decimals
- Probability
- Geo-board
- Slide rule
- Flow chart II.

Teachers guide: $1.60.
Student workcards: $45.00.

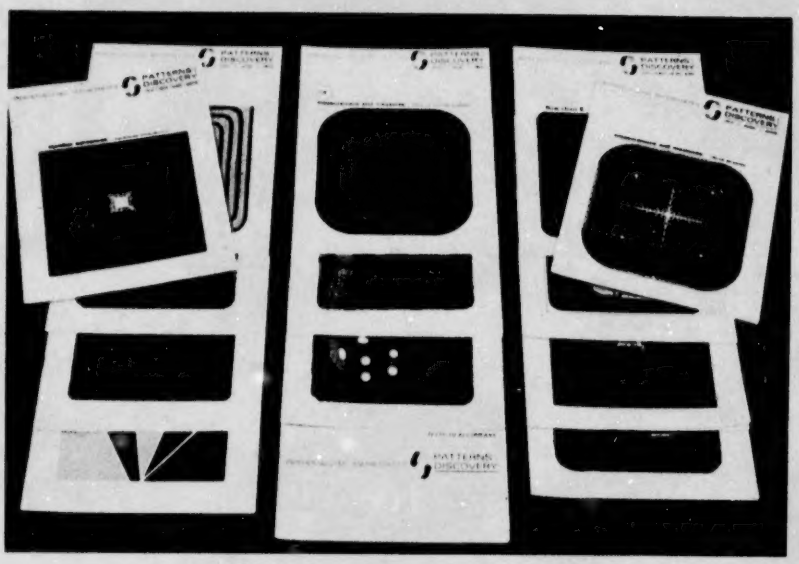
In the 'Patterns and Discovery' series are eight main booklets and four motivational booklets. Presentation is very simple and reading content is minimal. The material is well structured within each booklet and the cards provide extra work for students who finish the booklets.

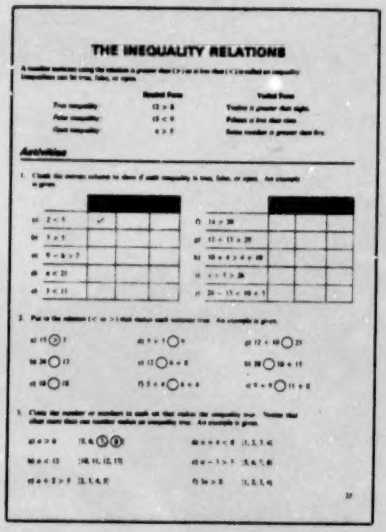
Teacher Comments

The material catered admirably for the bottom 15–20 per cent of the student population. The presentation is very clear and the reading level is suitable for those students having difficulty with reading. The class I taught comprised 12 boys and girls and these were split into three groups of four, generally working on different units. I usually gave a short background introduction to the booklet and then let the students work in groups. Three students indicated that they would rather work individually and these were allowed to do so. The material was successful with both groups and individuals.

The material in the booklets is excellently graded and this readily enabled the isolation of sections where students were having difficulty. The workcards provided extension material for the booklets and these were suitable for the majority of students.

The course catered for students who could not think abstractly and for those who had low reading ability. *Individualising Mathematics* is not a course to be used alone, for it neither satisfies the needs of the students nor the requirements of the syllabus. It should be supplemented with alternative approaches and materials to provide variety and motivation.




THE INEQUALITY RELATIONS

General Comments

The series aims at mathematically low-achieving students who have a low reading level. It seems to succeed in improving mathematical and arithmetical skills in the areas the booklets cover. The motivational booklets provide for some application but the teacher should be aware that alternative tangible materials and application will probably have to be provided.

ACTIVITIES IN MATHEMATICS, Second Course

PROPORTIONS

General Description

Authors: Johnson *et. al.*
Publisher: Scott Foresman and Company.
Supplier: Ashton Scholastic,
3rd Floor,
Teachers Union Building,
SPRING HILL. Qld. 4000.
School: Oxley State High School.
Teacher: Brian Carroll.
Class: Grade 9.

Materials Used

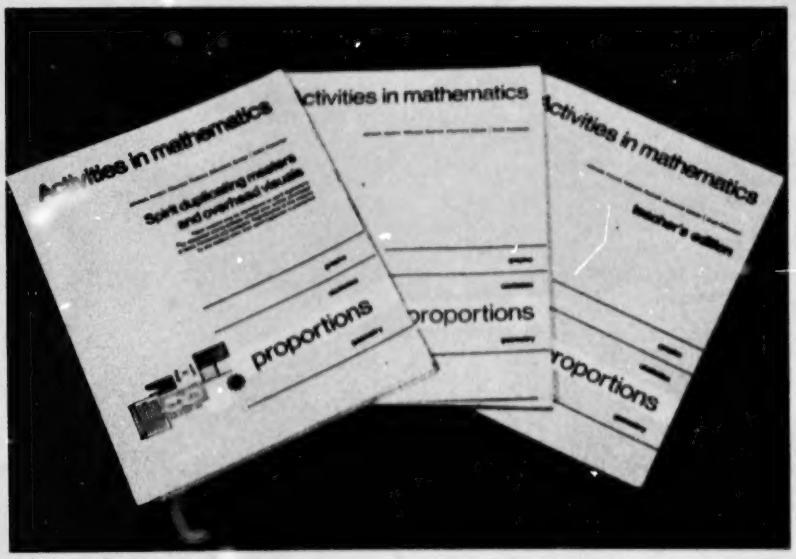
Students edition: $2.50.
Teachers edition: $2.50.
Book containing 30 duplicating masters and 10 overhead transparencies: $12.80.

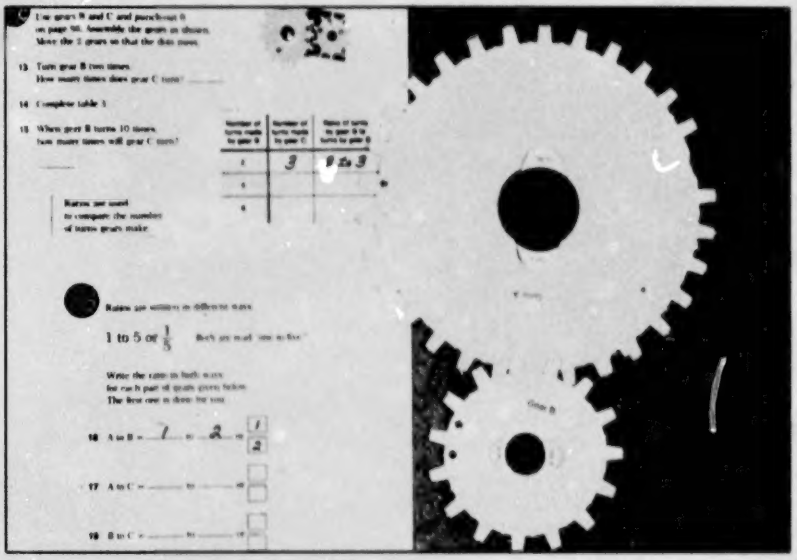
The course is oriented to activities, with various cardboard punch-outs such as rulers, protractors, photographs and some computational aids supplied at the back of each text book. This book, 'Proportions', included many aspects of Mathematics, e.g. equal ratios, multiplication of fractions, scale drawing, similar figures, percentage and related practical problems. Spaces are provided in the text book for the student to write-in answers and thus the books cannot easily be used again.

The activities mentioned in the title include making and using a set of paper gears to investigate ratio, making a fraction-decimal convertor and using a thickness gauge. All the materials to make these and many more are supplied at the back of the text book as noted above.

The teachers edition includes an overview, teaching notes for each activity and the answers overprinted on the student's pages. The duplicating masters provide supplementary test exercises where necessary and the overhead transparencies help with the introduction of certain topic areas.

Other books in the same series are 'Geometry' and 'Graphs and Statistics'. There is also available a 'First Course' in *Activities in Mathematics*, which would possibly be suitable for Grade 8 Mathematics. The presentation and organisation are similar to the 'Second Course'. The titles available in the first series are 'Patterns', 'Numbers', 'Measurement' and 'Probability'.





Teacher Comments

Initially student interest in the course was very good but about midway through the course some students had lost interest. This is not considered to be the fault of the program alone; it could be attributed to the students' requirements for a large variety of experiences and presentations. The cardboard punch-outs were successfully used by some students but the cardboard is fairly thin and easily torn when being removed from the pages. Once the punch-out was torn it was generally useless. The problem of storage of the cut-out models was finally solved by providing each student with a large envelope and keeping all the envelopes in a classroom cupboard.

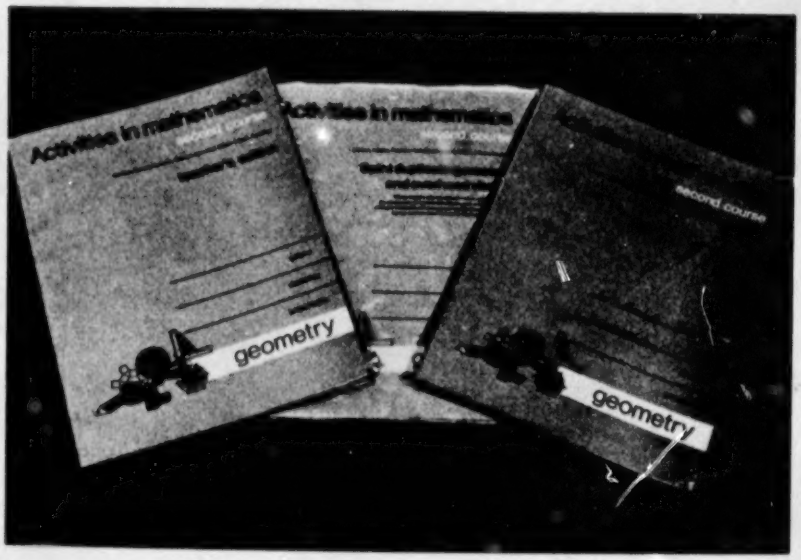
The measurements used in the text were not metric and conversion was impossible for many of the exercises. Although the text is American, the students generally accepted any obvious cultural differences with equanimity.

Students with very low reading abilities had some difficulty with the text and in some instances the instructions were not detailed enough and were ambiguous.

General Comments

This Course could be quite successfully used as one type of experience but integration with other courses would be necessary to maintain student interest and participation.

GEOMETRY



General Description

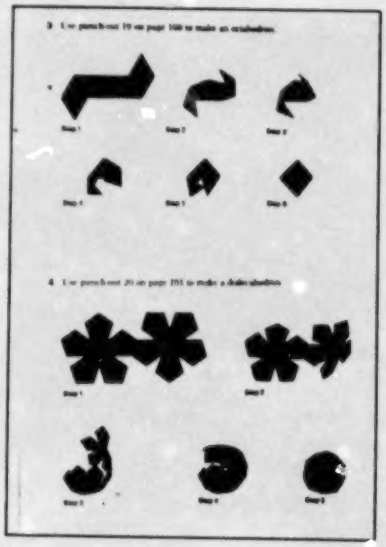
Authors: Johnson *et. al.*
Publisher: Scott Foresman and Company.
Supplier: Ashton Scholastic,
3rd Floor,
Teachers Union Building,
SPRING HILL. Qld. 4000.
School: Acacia Ridge State High School.
Teachers: K. Moore and H. Coleman.
Class: Grade 9.

Materials Used

Students edition: $2.50.
Teachers edition: $2.50.
Book containing duplicating masters and overhead transparencies: $12.80.

This is the last of a series of eight titles in the series, *Activities in Mathematics*. The book is in two colours and the presentation is very readable. There are four pages of punch-outs and a transparency grid in the back of the student text. The book is not easily re-usable as answer spaces are left for the students to fill in.

The content covered in the book includes polygons, areas, circles, construction of perpendiculars and angle bisector, solid figures and volume. There are cutout models for students to build, an 'area ruler', and a card game very much like 'polyhedron rummy' included in the punch-out card sections at the back of the book. This book would appear to cover most of the General Mathematics syllabus requirements for spatial relationships. A teachers edition and associated spirit masters, for extra exercises, and overhead transparencies are available.



Teacher Comments

My general impression of the book was that it benefited the students. Activity was greatly appreciated by both boys and girls who were bored with the formal approach to their standard text book. The games were very popular but sometimes tended to distract the students from the work in hand. The level of difficulty was very suitable for these students in that everyone was able to achieve something. Frequent opportunities were provided in the text to use basic arithmetic in the geometric activities and exercises. This enabled the students to do what was required at this level without becoming bored.

The sheets of extra exercises and activities, run off from the spirit masters, worked well, providing the students with variety and traditional problems on the topics covered in a more adventurous way in the text.

Minor criticisms of the book are that it is not metricated and that the cut-out materials are not really strong enough and tend to be lost easily.

General Comments

On the whole this book would be very suitable for students of low ability. It provides variety, sufficient topic depth and a high percentage student success rate.

MATHS: Book 3

General Description

Author: Holt.
Publisher: Macmillan, 107 Moray Street, MELBOURNE. Vic. 3205.
Schools: Newmarket and Coorparoo State High Schools.
Teachers: Mrs N. Roberts and Robyn Heywood.
Class: Grade 9.

Materials Used

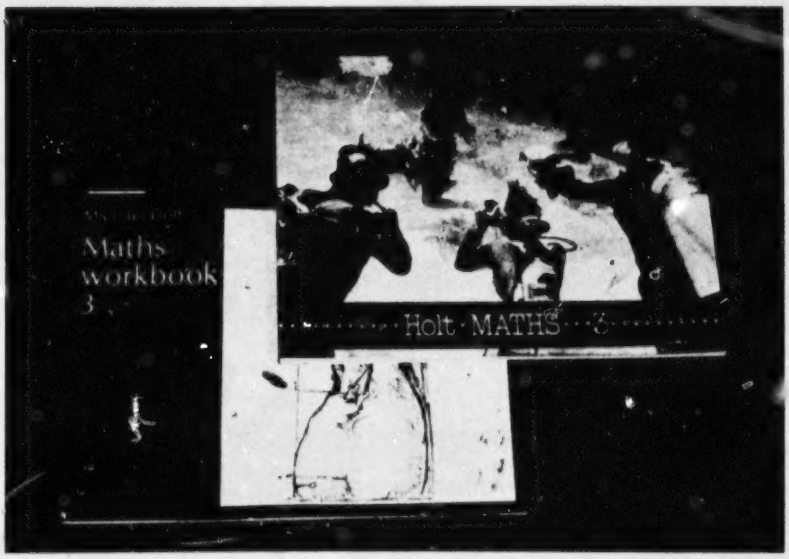
Student Book 3: test $2.50.
Student Activity Book 3: 70 cents.

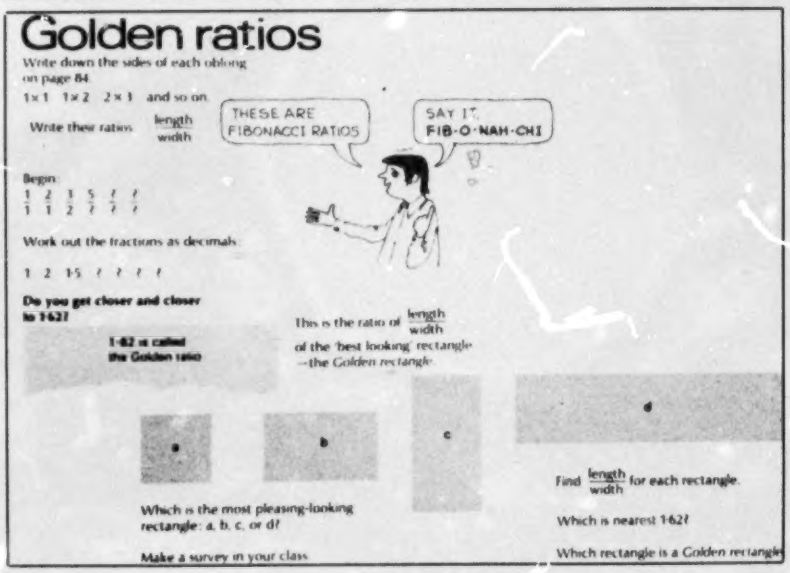
Book 3 is in the middle of an English series of five books designed for school children who are having difficulty with Mathematics.

The text book itself is re-usable and is very colourfully presented. Work per page is kept to a minimum and the reading level appears to be suitable for students with low reading ability. While the book is not structured in the usual sense of chapters on particular topics, the index suggests that number work from a practical stand-point is emphasised, and Measuring and Estimating, Shapes and Graphs are each covered in some detail. Most topics are presented on a double-page spread and Grade 9 students should be able to complete one topic activity in a 30-minute period. Questions are not always clearly marked out, but are often presented as suggested activities or investigations integrated with the text; this is initially confusing to some students. Topics are often open-ended, with further investigation work suggested in the text.

The activity book suggests different kinds of activities ranging from games to projects. It does not, however, indicate how it should be used in conjunction with the text book and, in fact, there is no real correlation between the two books. Either book could be used effectively on its own.

Books 1 and 2 of the series are being published in an Australian edition and these could be suitable as motivational material for remedial Mathematics students in Grade 8.




Golden ratios
Write down the sides of each oblong on page 84.
1×1 1×2 2×3 and so on.
Write their ratios length/width
THESE ARE FIBONACCI RATIOS
SAY IT: FIB-O-NAH-CHI
Begin:
1 2 3 5 / /
1 1 2 3 / /
Work out the fractions as decimals.
1 2 1·5 / / / /
Do you get closer and closer to 1·62?
1·62 is called the Golden ratio
This is the ratio of length/width of the 'best looking' rectangle —the Golden rectangle.
a
b
c
d
Find length/width for each rectangle.
Which is the most pleasing-looking rectangle: a, b, c, or d?
Which is nearest 1·62?
Make a survey in your class.
Which rectangle is a Golden rectangle?

Teacher Comments

– Newmarket State High School

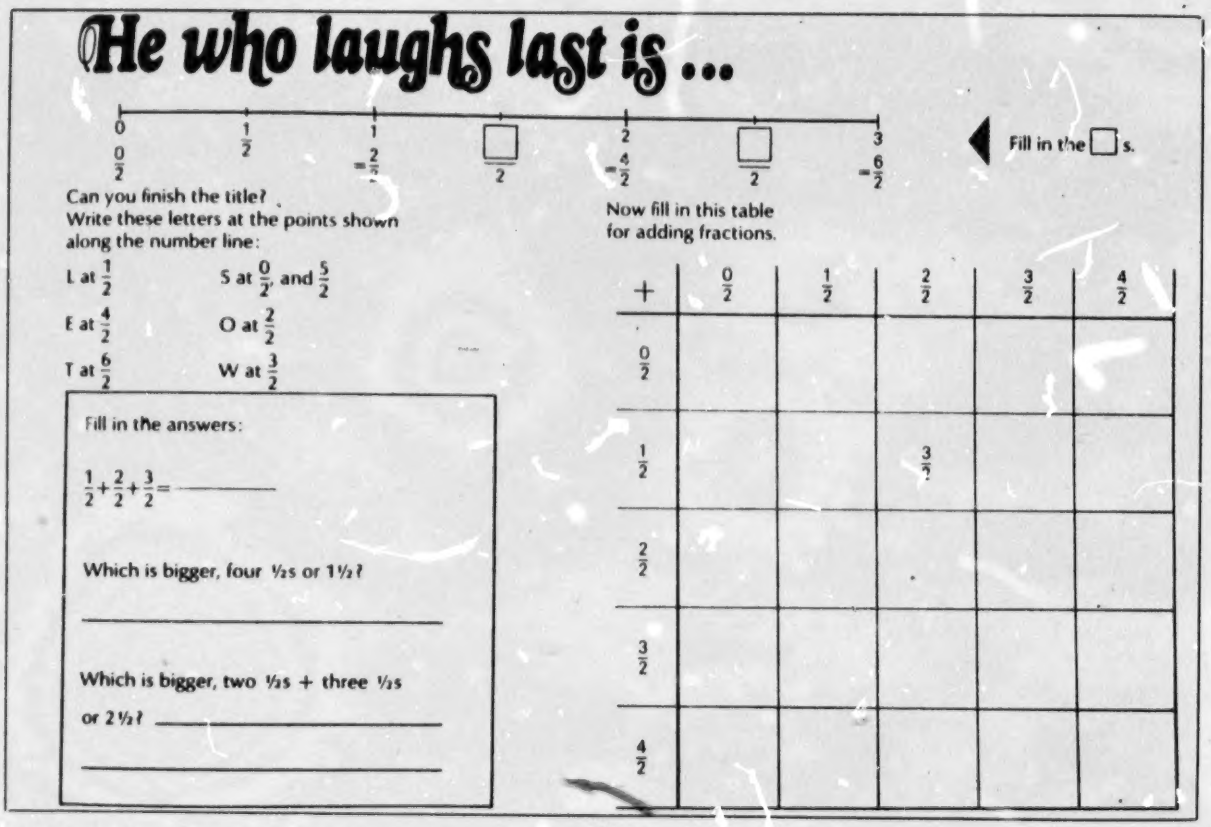
The students were allowed to work individually or in groups of two, three or four, as they wished. The books had appeared to be at the right maturity level. Some of the very weak children are now experiencing success every day in Mathematics for the first time in their school lives. Comments such as 'Terrific, isn't it?', 'It's beaut, Miss!', 'We think it's Mathematics, but it's not what we were doing before!' were common.

The activity books are not tied in with the text books, although there are sections which reinforce work done in the text book. This lack of correspondence between the two books means that the teacher has to be very aware of all the Mathematics involved in each activity. Students were allowed to use the activity books on completion of a certain amount of work in the text book, and in a Friday period, with a variety of Mathematical games available to students.

– Coorparoo State High School

The book was totally different from anything the students had used before, but it was quickly accepted as the norm. They liked working with both the text book and the work book, although some children said it was not Mathematics. The students are generally more motivated and there is a much more relaxed and friendly atmosphere in the class.

The students were allowed to work individually or in pairs and generally move ahead at their own pace through the text. Parts of the text are more oriented to boys than girls and on these sections my class of girls tended to skip those parts in which they were not interested. Careful supervision of each student's work is therefore required.



An answer book is not available and students have no way of knowing if the work they have completed is correct other than by the teacher's marking. I tended to wait until the majority of students had covered a certain section and then give answers and explanations, if necessary, to the whole class.

An alternative method of allowing students to work individually and yet retain some control would be to set an assignment load over a period of five days or so and then collect and mark on a given day.

Often material was required for completion of activities suggested in the text, and the teacher had to be aware of just what was required before the students needed it, e.g. dice, mecanno, graph paper, rulers.

General Comments

Both teachers using this text were prepared to let the material work for them, either with individuals or groups of students. The lack of an answer book for the text undoubtedly caused some problems. As this often resulted in closer teacher-student relationships, perhaps the author has intentionally omitted to provide one. Teachers and students in both classes felt that the text was successful and were very willing to continue it into the coming semester.

MATHS: Book 4

General Description

Author: Holt.
Publisher: Macmillan,
167 Moray Street,
MELBOURNE. Vic. 3205.
School: Toowong State High School.
Teachers: Gordon Russell and Jenny Caruthers.
Classes: Grade 9 Boys, Grade 9 Girls.

Materials Used

Book 4: $2.50.
Activity Book 4: 70 cents.

Book 4 is the fourth book of a five book series designed with the conviction that the greatest possible progress in learning Mathematics is made where the pupils' own interests, background and experience are used. There is a series of pages reinforcing traditional work on the four operations with a scatter of pages on the new Mathematics topics. The book concentrates on number techniques to solve everyday problems – often presented in picture form and new topics such as scattergrams and network problems. There are no drill exercises as such, but routine arithmetic is often required to solve stimulating puzzle problems. The activity book provides further practice in computations through partially completed calculations, graphs, and so on. It requires little or no teacher supervision.

Teacher Comments

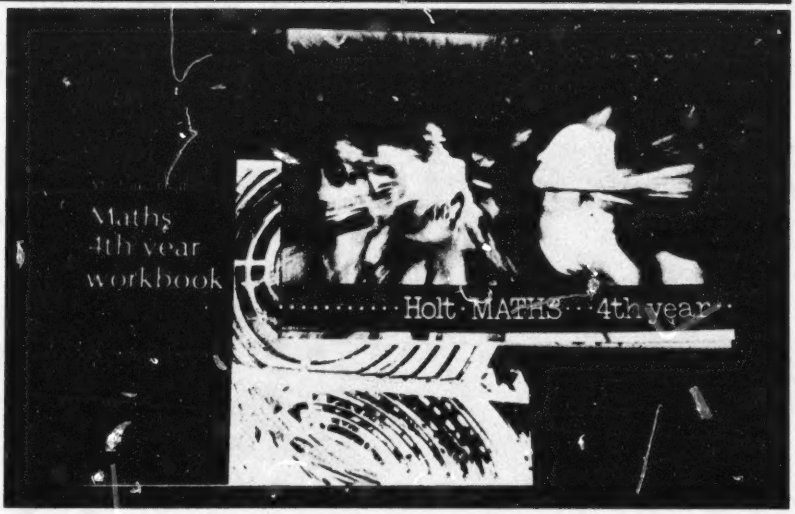
Although the books are radically different in appearance and presentation to those students had used previously, they were quickly accepted. Except for one group in the girls' class, all students have maintained the initial interest. Some topics seemed childish for the groups while others were difficult.

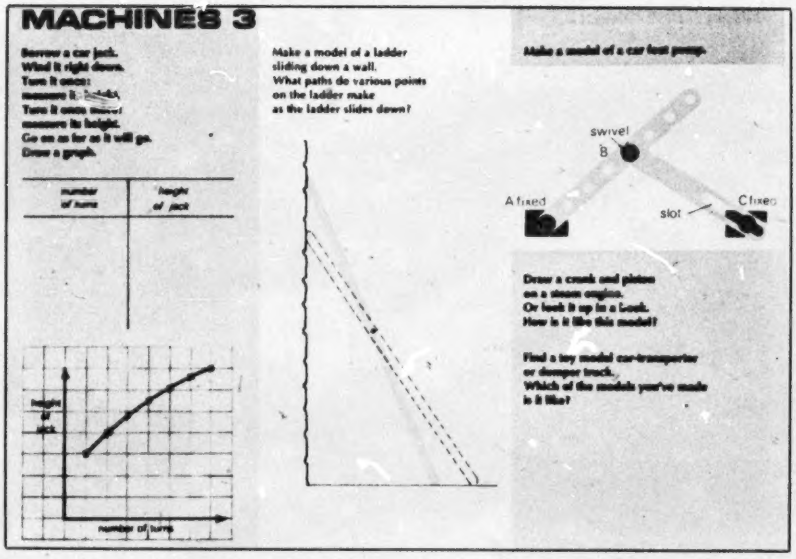
Students tended to miss some of the questions, mainly because of the different approach to previous Maths texts they had used. There is no carryover of topic from page to page, but the Table of Contents lists each topic and the page(s) on which it can be found.

A marked increase in interest has been noted in the Grade 9 book where two students (one boy, one girl) 're-joined' the Maths class after being at a complete loss on the previous text. A new admission, a girl from the Philippines, found no trouble with Holt, although every word in other texts would frustrate her.

Discussions promoted by cartoons, drawings and headings have encouraged many students to contribute to a Maths lesson and thus re-gain (or gain) some self-confidence.

There is not enough work in each section for students to practise and consolidate their experiences after the initial stimulation. The puzzles were interesting.




MACHINES 3
Borrow a car jack.
Wind it right down.
Turn it once:
measure it.
Turn it once more:
measure its height.
Go on as far as it will go.
Draw a graph.
number of turns
height of jack
height of jack
number of turns
Make a model of a ladder sliding down a wall.
What paths do various points on the ladder make as the ladder slides down?
Make a model of a car foot pump.
swivel
B
A fixed
slot
C fixed
Draw a crank and piston on a steam engine.
Or look it up in a book.
How is it like this model?
Find a toy model car-transporter or dumper truck.
Which of the models you've made is it like?

but as with the text questions, no answers were provided. To work effectively the course must have the support of

- *Work cards* for extra practice. The activity book may provide the extra work required here, but this was not available for the test and so no comment can be made.
- *Apparatus* to complete suggested activities. Much material was found or borrowed from other departments in this school but disposable materials required for many suggested activities would have to be budgeted from some source.

A minor criticism of the texts is that many of the items have a British flavour, e.g. money is quoted in British decimal currency.

General Comments

This book approaches Mathematics through the environment and through practical experience. While the initial stimulus is provided it is often left to the teachers to lead the students into projects following on from this stimulus. These projects can be then aimed directly at the students' level.

Support materials were not provided for the test and the teachers had difficulty in obtaining much of the required material. Some of the material can often be found within the school in other departments, while disposable materials, such as card and pineboard, can sometimes be obtained from shirt and shoe boxes and from discarded window displays from local stores.

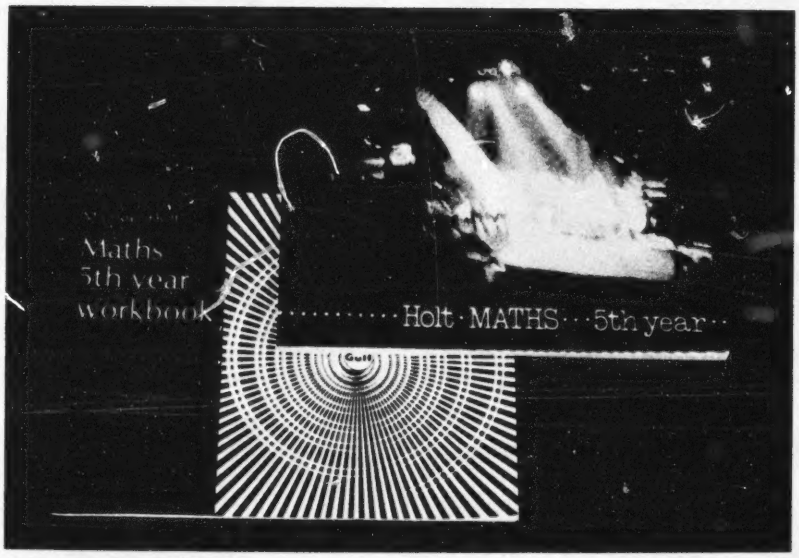
MATHS: Book 5

General Description

Author: Holt.
Fal lisher: Macmillan,
107 ?oray Street,
MEL OURNE. Vic. 3205.
School: Toowong State High School.
Teacher: Jenny Caruthers.
Class: Grade 10.

Materials Used

Student Book: $2.50.
Student Activity Book (available only after trial): 70 cents.



Woolly thinking
Marlene works on Saturdays on the wool counter at Sparks and Marks. S & M still has old stock of balls of wool marked in ounces (oz).
THIS PATTERN SAYS I NEED 9 OUNCES OF WOOL
HOW MANY 50 GRAM BALLS OF WOOL WILL THAT BE?
1oz → 30g
SO 9oz WILL BE 270g
HOW MANY 50g BALLS OF WOOL?
LET'S SEE: 5 BALLS IS 5x50 OR 250g
YOU ALWAYS NEED OVER THE FIGURE, NOT UNDER, SO ADD ANOTHER BALL. MAKING 6 BALLS IN ALL.
Weight given in pattern (oz)
How many 50g balls of wool
Marlene mapped out a few. Check them and map the rest.
Make a mapping for all these knitting patterns. Copy the drawings first.

Book 5 is the fifth of a five-book series designed for 11 to 16-year-old students. Presentation is similar to Books 1 to 4 already described. In particular the book aims to keep the students interested and concentrates on number patterns, graphing, estimating and measuring and statistics. Many of the topics are of high interest, e.g. 'The Unborn Baby', 'Social Diseases', 'H.P.', 'Banking', 'Cooking'. Only the Mathematics required to solve these problems is covered in the book.

Some teachers may consider it necessary to supplement this book with traditional arithmetic, algebraic and geometric practice materials.

Teacher Comments

The book is very attractive to the students and the inclusion of topical problems provided good areas for discussion and group projects. The book did stimulate interest in Mathematics, but I frequently felt that it did not provide enough depth, nor were there enough exercises. Neither section tests nor answers to exercises are provided. Perhaps a combination of this program and one more traditional would have been more appropriate.

However, many sections really caught the interest of this class of girls and the resultant in-depth projects, on such topics as 'The Unborn Baby' and 'Housing', involved students in library searches, housing surveys, the recording and interpreting of associated statistics and many other aspects of Mathematics. The text provides a wide variety of activities and it expects the teacher to expand, in *some* of the topic areas, on the interest created.

As with Book 4, apparatus is needed if many of the activities are to be successfully completed. Unfortunately, this apparatus was not available for the test.

General Comments

No single grade book can be regarded as the syllabus – and Holt Maths Book 5 is no exception. The stimulus section is very well done and the projects likely to arise from it should be planned, to provide either depth support, or exercises, or both. Support materials are necessary, but these can normally be found or developed with ingenuity.

WORLD OF MATHEMATICS, Books 5 and 6

General Description

Author: G. Marshall.
Publisher: Nelson,
547 Little Collins Street,
MELBOURNE. Vic. 3000.
School: Mitchelton State High School.
Teachers: Helen Hall and Terry Walkington.
Class: Grade 10.

Materials Used

Student Book 5: $1.85.
Student Book 6: $1.85.

Books 5 and 6 are the last of a series of six books designed for low-achieving students in Mathematics aged 11 to 16. The material is clearly presented and it is claimed that the reading level is for eight to 11-year-olds. The Mathematics is well structured and is often introduced from a practical standpoint. The exercise sections are clearly labelled and there is a puzzle section at the end of Book 6.

Books 1 and 2 appear to be a little immature for Grade 8 students but Books 3 and 4 might be integrated into remedial Mathematics teaching in Grade 8. In particular the Activity Books for Books 3 and 4 provide materials and activities where the individual student can achieve success.

Teacher Comments

The students were initially attracted to the material by its difference from other books. They thought the page layouts were easy to read and looked far less difficult. A lot of material is required – beakers, jugs, rulers, stop watches, tapes – but much of this was provided on loan by the Physics Department. Geoboards were made and rulers, compasses and pencils were acquired from the lost property section.

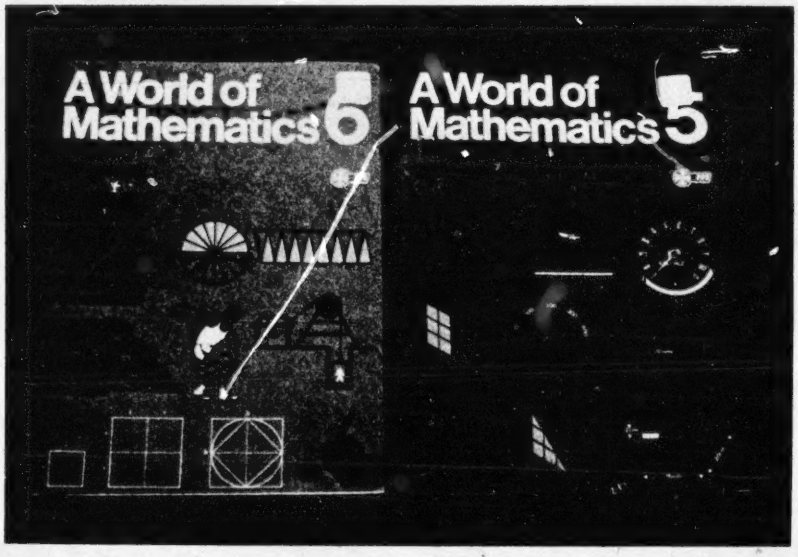
Most of the topics began at a very easy Mathematics level but progressed too quickly into much harder sections. This meant that most students did not have time to consolidate success. The same too-rapid progression to the difficult was true of the exercises and supplementary exercises had to be provided.

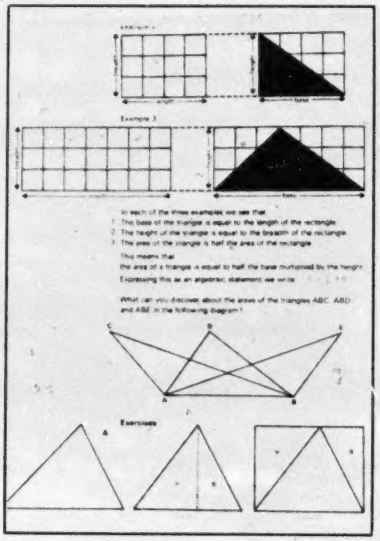
Books 5 and 6 were used together and the puzzle section at the end of Book 6 became a reward for work completed on time. On the whole the students are now much more eager to come to Mathematics lessons, but I feel that there is a need to combine a course such as World of Mathematics with a more traditional one.

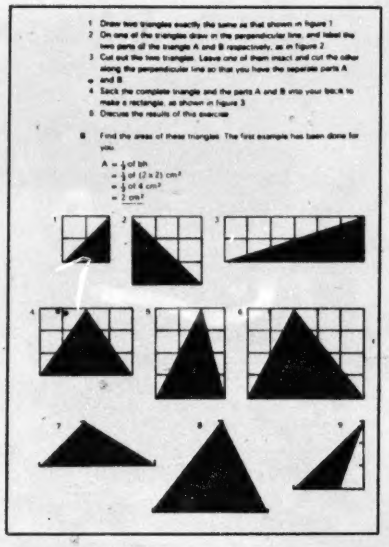
(In 1975 we plan to use this text in conjunction with Developmental Mathematics in Grades 9 and 10.)

General Comments

These books obviously involved the students to a large extent in the practical applications of Mathematics. The exercises, which at first seemed well structured, proved inadequate. It is possible to provide supplementary exercises and/or further project work. This undoubtedly means extra preparation for the teacher but the end product seems to be a sound environmental, interpretation of the syllabus, based on activity.







CONCLUSION

The impetus for this review arose from the concern many teachers felt about the problems that students were encountering in the General Mathematics course. Some of the problems of low-achieving students are not directly attributable to mathematical ability and teachers who are aware of these contributory factors are in a better position to plan a suitable General Mathematics course.

In planning such a course teachers should look at the many choices of programs available for low-achieving Mathematics students, look at the variety of project-oriented support materials available and assess the value of mathematical games and aids which either pertain to the principles and content being taught or are highly motivational.

This *Resources Review* has concentrated solely on the commercially available programs. Further issues of *Resources Review* are planned to cover the other two aspects mentioned above. A table comparing the emphases of the different programs that were tested has been compiled and is reproduced as an appendix. The Mathematics syllabus mentions that students should develop the ability to apply Mathematics to problems and to think creatively. It also states that the General Mathematics student learns Mathematics best when it is taught through well-defined, practical situations. All the programs tested would seem to go some way towards implementing these requirements.

It should also be mentioned that many programs evoked a student response of 'It's good fun, but not Mathematics' and the motivational aspect of this cannot be too much emphasised.

Many of the programs' strengths and weaknesses have been isolated in the sections devoted to comments, and suggestions have been made about possible adaptations and the type of supplementary support material required. It is hoped that this will help teachers to plan relevant and realistic courses for their General Mathematics students.

ACKNOWLEDGMENTS

This publication was prepared by Mr S. Murray in consultation with Mr R. Boxall, officers of the Curriculum Branch, and prepared for publication by officers of the Information and Publications Branch, Department of Education, Queensland. The assistance of the teachers mentioned in this review who participated in the trial and commented on the draft copies, and Mrs M. Carss, who helped in the initial planning and trialling of the materials, is greatly appreciated.

October 1975

All materials listed, as well as many others recently available, can be examined at the Education Department Library, Third Floor, Treasury Building. Teachers wishing to discuss these materials are invited to contact Steve Murray at the Curriculum Branch, Fifth Floor Annexe, Treasury Building, telephone 224 6859. Details of availability and costs are subject to change.

APPENDIX

This table presents an overall view of the programs that were tested. The ratings have been estimated from the 'Materials Used' and 'Teacher Comments' sections. The number allocated to each box reflects the emphasis that program places on the aspect considered.
3 is a high emphasis; 2 a moderate emphasis; and 1 a low emphasis.

	Units in Mathematics	S.M.P.	Individualising Mathematics	Activities in Mathematics	Maths – Holt	World of Mathematics
Organisational Emphasis						
Environmental topics	3	2	1	2	3	2
Mathematical topics	1	3	3	2	1	2
Caters for low reading age	3	1	3	3	3	2
Intended Outcomes Emphasis						
Increase in awareness/knowledge of mathematical concepts	1	3	2	1	1	2
Improvement of problem solving technique	2	2	1	3	3	2
Increase in computational skills	1	2	3	2	1	2
Means of Achieving Outcomes Emphasis						
Use of carefully sequenced mathematical program	2	3	3	2	1	2
Caters to student interests, to promote student identification with subject matter	2	2	1	2	3	2
Involvement of student with concrete materials	2	3	1	2	2	3